

USGS Committed to Sustainable Land Imaging (SLI)

- Has participated since the beginning
 - Steering Group, Requirements, Ground system expertise on the AST
 - Many high-level meetings across Administration
- Driving concern is need for operational successor to Landsat 7
 - Gap coming in thermal, potentially multispectral in 2018

SLI Discussion:

- How do we mitigate a gap? (Sentinel-2, thermal sensor on a UAS...)
- **Need to determine if alternatives exist and how effective they can be in meeting application needs**

Senate Language: June 5, 2014

“Landsat Data Continuity.—The Committee provides \$68,100,000, \$4,000,000 above the request, for a land imaging mission successor to Landsat 8. With Landsat 7 at risk for ending its mission life as early as 2017, the Committee is deeply troubled at the potential loss of 8-day continuous terrestrial coverage now provided through the Landsat satellite series. The Committee does not concur with various administration efforts to develop alternative “out of the box” approaches to this data collection—whether they are depending on commercial or international partners. Given the constraints in Federal funding and the absence of credible alternatives to a conventional land imaging mission that ensures Landsat data continuity, ***NASA should proceed with an acquisition in fiscal year 2015 for a mission to launch a follow on to Landsat 8 by not later than 2020 that does not exceed a cost cap of \$650,000,000, inclusive of all launch vehicle costs. Such a mission shall maximize the utilization of non-recurring engineering efforts from Landsat 8 to maintain a relatively low level of project risk.*** In addition, as a follow on to Landsat 8, program reserves shall be limited to not more than 10 percent for the duration of the mission’s development and all hardware contracts should be firm fixed price and reflect steep discounts over the price paid for comparable components for Landsat 8. The Committee notes that the notional land imaging fiscal year 2016 budget is now more than \$100,000,000 below what is needed for a 2020 launch. Hence, the Committee expects the 2016 budget to reflect resources necessary to meet that launch date.” <http://www.gpo.gov/fdsys/pkg/CRPT-113srpt181/pdf/CRPT-113srpt181.pdf>

Departments of Commerce, Justice, and Science, and Related Agencies Appropriations Bill, 2015, p. 109

Administration Response: June 17, 2014

Statement of Administration Policy:

“Future Science Missions. The Administration appreciates the Committee's support for science missions, but is concerned about prematurely specifying elements of future missions while the missions are in a very early state of development. In particular, the Administration believes the Committee's proposed approach to a follow-on Landsat mission is not feasible within the bill's proposed cost cap of \$650 million...”

http://www.whitehouse.gov/sites/default/files/omb/legislative/sap/113/saps4660s_20140617.pdf

Statement of Administration Policy (Senate) June 17, 2014

Landsat is Number 2!

- October 2010: Congress directs the White House Office of Science and Technology Policy (OSTP) to produce and routinely update a strategic plan for Earth observations
- February 2011: OSTP convenes a **National Earth Observations (NEO) Task Force**, drawn from 11 Federal departments and agencies
- 2012: NEO Task Force conducts an **assessment of 362 EO systems** (space, air, land, and sea platforms) with regard to their contributions within a framework of 13 societal benefit areas; **among 132 satellite systems, Landsat ranks second highest in impact**
 - Highest user impact from loss of any Earth imager; third highest from loss of any system
 - Medium-resolution observations used in 10 of 13 Societal Benefit Areas (SBAs)
 - Landsat's imaging ranked #1 for contributions in Bio-diversity, Eco-Systems, and Energy SBAs
 - Ranked #2 for contributions in Ag/Forestry, Climate, Human Health, and Water SBAs
- April 2013: OSTP releases the **National Strategy for Civil Earth Observations**, which describes assessment methodology and calls for updates every 3 years
- July 2014: OSTP releases the **National Plan for Civil Earth Observations**; made formal recommendations to support range of EO efforts, including NASA/USGS joint efforts to sustain moderate-resolution, multispectral, satellite-based EO

DOI and USGS Very Involved in U.S. National Plan

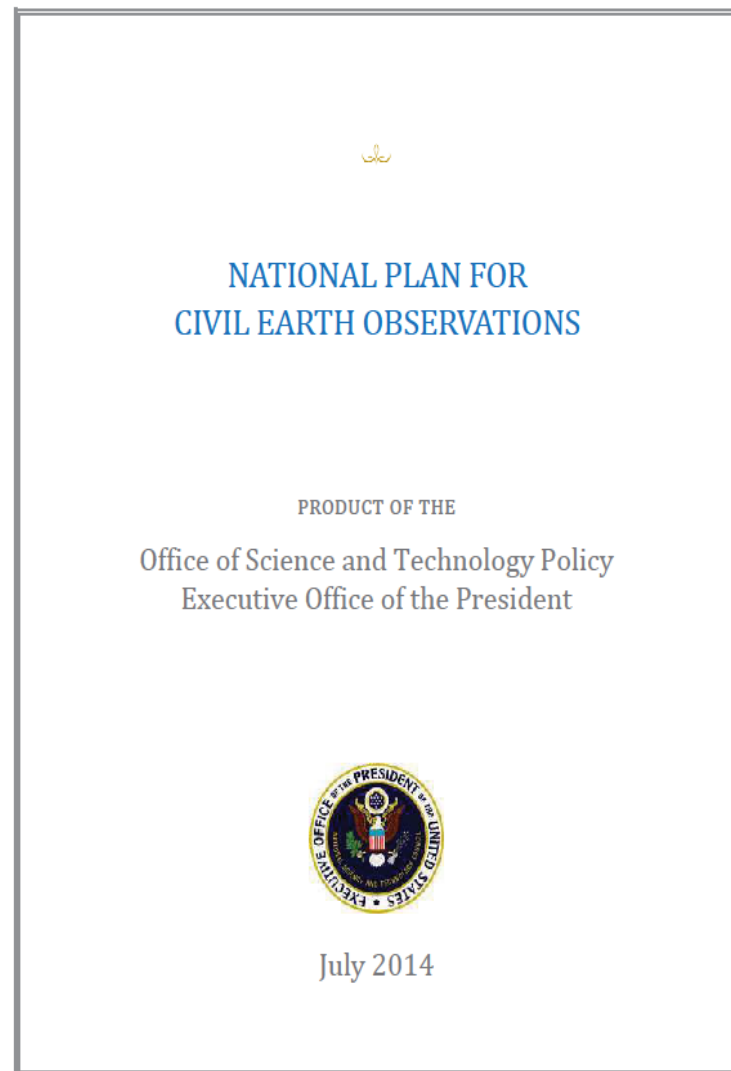
First-of-its-kind interagency-coordinated Plan
<http://www.whitehouse.gov/blog/2014/07/18/harnessing-observations-and-data-about-our-earth>

Based on government-wide assessment of the Nation's Earth Observations *portfolio*

Led by OSTP via US Group on Earth Observations, to be revised every three years

USGS and NOAA requirements processes used to support EOA-1 SBA Teams made up from NSTC experts

Utilizing USGS LRS RCA-EO Project and processes for EOA-2



Landsat Number 3 out of 145 High Impact EO Systems

Annex I: 2012 EOA Results

This annex provides results for the 145 high-impact observation systems identified from the 362 observation systems assessed by the 13 SBA teams of approximately 300 Federal subject-matter experts. These 145 observation systems are listed in two tiers in the tables below. Impact is indicated with respect to each of the 13 societal themes (12 SBAs and reference measurements), as described in Section 2.2.

Table 1: Tier 1 High-Impact Observation Systems (Ranked Order)

Observation System (Ranked Order)	Agency	Ag&Frst	BioDiv	Climate	Disasters	Ecosys	Energy	HumanHlth	Ocn&Cstl	Space Wx	Trans	WaterRes	Wx	RefMeas
1. Global Positioning System (GPS) satellites	DOD/USAF													
2. Next Generation Weather Radar (NEXRAD)	DOC/NOAA								*					
3. Landsat satellite	DOI/USGS, NASA										*			
4. Geostationary Operational Environmental Satellite System (GOES-NOP)	DOC/NOAA			*		*								
5. National Agriculture Imagery Program (NAIP)	USDA/FSA													
6. Airborne LIDAR	DOC/NOAA, DOD/USACE, DOI/USGS, NSF													
7. Forest Inventory and Analysis (FIA)	USDA/USFS							*						



National Research Council (NRC) Report (2013)

NRC Space Studies Board: The U.S. Government should establish a “Sustained and Enhanced Land Imaging Program” with persistent funding for current and future needs:

- Develop a plan for a comprehensive, integrated program that capitalizes on NASA and USGS strengths, maintains current capabilities, and enhances imaging capabilities and data products via emerging technology
- Ensure data flow continuously from satellites and periodically from aircraft to respond to the needs of image analysts and producers and consumers of derived products
- Establish partnerships with commercial firms and international programs
- Coordinate land-imaging data buys across the Government
- Include an R&D component for improved data products, new measurement methods, and evolving requirements
- Landsat is part of an extensive, multi-sensor program
- Consider low-cost alternatives for data continuity

NRC report: http://www.nap.edu/catalog.php?record_id=18420

DOI Remote Sensing Working Group (DOIRSWG)

Goals:

- Exchange information on remote sensing activities, capabilities, needs, and concerns
- Identify opportunities for cooperation among Bureaus and Offices
- Integrate Bureau and Office requirements and concerns into coordinated DOI positions on national remote sensing issues
- Inform DOI Bureaus and Offices about U.S. and foreign remote sensing programs and plans (USGS, BLM, NPS, OSM, FWS, BOR, OWF, BIA)

Activities:

- Create online, fully searchable annual reports to highlight the value of remote sensing to DOI missions
 - Large variety of interdisciplinary applications and technology <http://eros.usgs.gov/doi-remote-sensing-activities/2012/Home>
- Monthly briefings and discussion on agency remote sensing projects and technology
- Partnering to share remote sensing training materials among DOI and US Forest Service

Recommendation:

- DOIRSWG would benefit from a better understanding of LST activities, and vice versa

Discussion

Data continuity is now in question:

- Landsat 7's fuel supply will be depleted by 2018; any key component could fail beforehand
- Landsat 8's thermal sensor design life is exceeded in 2016; mission design life by 2018
- End of either mission results in loss of 8-day revisit, needed by 70% of users, including decision-support applications like agriculture monitoring, forest and wildfire management, flood monitoring
- NASA continues to study options for the next mission; as it takes a minimum of five years to develop and launch a new mission, a gap is now probable

SLI Discussion:

- How do we mitigate a gap? (Sentinel-2, thermal sensor on a UAS...)
- **Need to determine if alternatives exist and how effective they can be in meeting application needs**